

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 09/291,748

REMARKS

Reconsideration and allowance of the subject application are respectfully requested.

Upon entry of this Amendment, claims 1-10 are pending in the application. In response to the Office Action (Paper No.), Applicant respectfully submits that the pending claims define patentable subject matter.

The drawings are objected to because the Examiner maintains that Figures 1-3 should be labeled "Prior Art". Along with this Amendment, Applicant is submitting replacement drawings wherein Figures 1-3 are labeled "Prior Art". Accordingly, the Examiner is requested to remove the objection to the drawings.

The Examiner maintains that "a substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) because the *More Detailed Description* (pg. 8-12) is written using legal phraseology". However, there is no provision in 37 C.F.R. or the MPEP, of which the Applicant is aware, prohibiting the use of legal phraseology (i.e., "means" language) in the specification (see 37 C.F.R. § 1.171 and MPEP 608). Accordingly, the Examiner is requested to remove the objection to the specification.

Claims 1-10 are rejected under 35 U.S.C. § 102(e) as being anticipated Popovic (USP 6,393,047). Applicant respectfully submits that the claimed invention would not have been anticipated by or rendered obvious in view of the applied reference.

Popovic discloses a method and apparatus for generation of optimal code sequences used to perform spreading and de-spreading functions in a code division multiple access communication.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 09/291,748

As shown in Figure 2, a CDMA radio station transceiver 30 includes a transmit branch formed by a spreader 32, a modulator 34 and an RF processing block 36, and a receive branch formed by an RF processing block 50, a demodulator 48 and a de-spreader 46. In the transmit path, the spreader 32 receives information bits to be transmitted and spreads those information bits over the available frequency spectrum in accordance with a spreading code generated by a spreading code generator 40.

As shown in Figure 3, the spreader 32 includes multipliers 52 and 54 which respectively receive two separate biphasic (+/-1) information streams, such as a traffic data stream and a control data stream, which are to be spread and IQ multiplexed. The traffic and control data streams are spread by different (real and imaginary) channelization codes via the multipliers 52 and 54 and then mapped to the I and Q branches. The channelization codes are employed to separately identify and distinguish the real and imaginary information streams at the receiver. In the situation where plural traffic and control data streams are to be transmit in parallel from a single mobile user, plural orthogonal channelization codes are used to make the necessary parallel code channels. The quadriphase spreading code generated by spreading code generator 40 is employed by to spread the complex information signal. The complex multiplier 60 in a QPSK data modulator performs complex multiplication between the complex data stream $I+jQ$ and a complex (quadriphase) spreading code (e.g., temporarily allocated to a mobile station) to provide the spread signal output to the modulator 34. The code generator 40 generates the quadriphase spreading codes used by the complex multiplier 60 by extending the length of a set $S(2)$ of quaternary spreading codes (i.e., adding one quaternary code symbol to the end the

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 09/291,748

quaternary spreading codes) so that the length of each of the quadriphase spreading codes is a multiple of spreading factors used in the CDMA mobile system.

Independent claim 1 is directed to "[a] transmission device enabling different spreading factors while preserving a common scrambling code for transmission in a code division multiple access cellular mobile radio system". Claim 1 requires "spreading means for spreading blocks of symbols with the different spreading factors; and scrambling means for applying a scrambling code of length QMAX which is a multiple of said different spreading factors, to blocks of QMAX basic symbols obtained by spreading with any of said spreading factors." Claim 2 recites similar limitations.

Independent claim 3 is directed to "[a] reception device enabling different spreading factors while preserving a common scrambling code for transmission in a code division multiple access cellular mobile radio system." Claim 3 requires "descrambling means for applying a scrambling code of length QMAX which is a multiple of said different spreading factors, to spread blocks of QMAX basic symbols obtained by spreading with any of said spreading factors; and despreading means for despreading with said spreading factors said blocks of QMAX basic symbols descrambled by said descrambling means." Claim 4 recites similar limitations.

With regard to independent claim 1, the Examiner cites Figure 3, column 6, lines 1-3 and 10-40 of Popovic for disclosing "channelization code spreading means for spreading blocks of symbols with the different spreading factors". Further, the Examiner cites column 12, lines 33-50 for disclosing "scrambling means for applying a spreading (scrambling) code of length L (QMAX) which is a multiple of said different spreading factors ($L = SF(k) \cdot 2^k \dots$) to blocks of L

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 09/291,748

(Qmax) basic symbols obtained by channelization code spreading ... with any of said variable spreading factors.” (Office Action at page 3). As best understood by the Applicant, the Examiner appears to be asserting that the claimed spreading means reads on the multipliers 52 and 54 (Fig. 3) which spread the (traffic and data) information streams using the real and imaginary channelization codes, and the claimed scrambling means reads on the complex multiplier 60 (Fig. 3) which spreads the complex data stream using the quadriphase spreading code. Further, the Examiner asserts that Popovic disclose a “multiplicity relationship between the spreading factors of the channelization code and the length of the [quadriphase] spreading code (col. 12, lns. 38-50).” (Office Action at page 5).

Popovic is directed to a multi-rate CDMA system (i.e., a CDMA system supporting different data rates). In such a system, there is further considered a relation between the spreading factor $SF(k)$ (or number of chips within a data symbol), and the spreading code lengths L (obtained by the technique which has been chosen in the system for generating the spreading codes). As discussed at col. 12 lines 32-50 of Popovic, this relation is $SF(k) = L/2^k$, where k is proportional to the data rate.

The Examiner contends that this teaching of Popovic corresponds to the claimed feature of “scrambling means for applying a scrambling code of length QMAX which is a multiple of said different spreading factors, to blocks of QMAX basic symbols obtained by spreading with any of said spreading factors”. However, Applicant respectfully disagrees with the Examiner’s interpretation of col. 12 lines 32-50 of Popovic for at least the following reasons.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 09/291,748

In the present invention, spreading and scrambling refer to distinct operations, the scrambling operation in the circumstances being applied after spreading, as also explained in more detail in the present application. On the other hand, in Popovic, the above notions of spreading factor (SF(k)) and spreading code length (L) refer to a same and single operation, i.e., the operation of spreading. Indeed, as indicated above, the spreading factor is the number of chips within a data symbol, and the spreading code length is the length of the spreading codes as obtained by the technique which has been chosen in the system for generating the spreading codes. That is, the complex signal input to the complex multiplier 60 is spread using a corresponding CDMA spreading code generated by the code generator 40 wherein a multiplicity relationship exists between the spreading factors of the spreading code (not channelization code) and the length of the spreading code.

Accordingly, Popovic simply discloses that the length of the spreading code (rather than a scrambling code) is a multiple of the spreading factors.


In view of the above, Applicant respectfully submits that claims 1-10 should be allowable because the cited reference does not teach or suggest all of the features of the claimed invention.

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 09/291,748

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Respectfully submitted,



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